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A National Environmental/Energy Workforce Assessment. Virgin Islands

National Field Research Center, Inc, Iowa City, Iowa

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A National Environmental/Energy Workforce Assessment

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16. ABSTRACT

This study is one of 70 volumes assessing the workforce needs (manpower needs) for pollution control and abatement in the United States for the five-year period of 1976 through 1981. Seven fields for pollution control — air, noise, pesticides, potable water, radiation, solid waste, and wastewater — are analyzed, together with energy-related programs currently accentuated by the national effort to solve energy supply problems.

Designed as Phase I of a three-phase program, the complete assessment includes the following volumes: one each for the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands; one for each of the ten EPA regions; a one-volume National Abstract; a volume on National Legislation; a volume on Business and Industry; and a four-volume National Summary. The information was gathered through extensive personal interviews with responsible federal, state, and local officials in every state; with officials of representative private industrial and commercial firms; and with representatives of national industrial and trade organizations.

Phase II will develop a broad national inventory of the entire range of post-secondary and higher education training offered in the pollution control and energy areas cited above, and Phase III will offer demonstrations for curriculum changes or modifications which appear necessary to assure an adequate and properly trained national environmental/energy workforce.

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for

VIRGIN ISLANDS

Conducted by:

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PREFACE

This report presents existing workforce levels, training programs, and career potentials and develops staffing level projections (1976 - 1981) for the Virgin Islands of the United States in the environmental pollution control areas of air, noise, pesticides, potable water, radiation, solid waste, waste water, and energy. This study was carried out for the United States Environmental Protection Agency by National Field Research Center of Iowa City, Iowa.

The information and data presented in this report were compiled in large part from extensive interviews with professionals working in the respective areas and were supplemented by telephone surveys and research.

FOREWORD

The material herein contains the information and data collected for eight individual pollution control inventories conducted for the Virgin Islands of the United States. The format includes work-force profiles, projections, growth and career potential for each of the areas investigated. Growth projections are necessarily based on best professional estimates developed from available information and represent what are felt to be realistic figures by experts in the respective areas. The pollution control areas considered by this study are as follows:

Air

Noise

Pesticides

Potable Water

Radiation

Solid Waste

Waste Water

Energy

National Environmental Energy
Workforce Assessment

Phase I

VIRGIN ISLANDS

Territorial Summary

I. AIR

The air quality in the Virgin Islands of the United States currently meets all standards of ambient air quality established under the Clean Air Act. The territory's air pollution control program comes under the auspices of the Department of Conservation and Cultural Affairs and is staffed by 18 individuals who represent the state/local effort on the islands. Prospects for career openings in this program or in the industrial sector have been classified as slim due to the lack of resources to finance new positions and the absence of either a significant labor force or industrial growth.

Training has been quite successful; however, the program director believes that training is never complete and therefore frequently requests both general and island-specific air pollution training workshops and/or courses for both the technical and professional staff.

II. NOISE

Currently, the Virgin Islands Government possesses no noise control statutes aimed at reducing industrial and residential noise through specific acoustical requirements. During Fiscal Year 1976, a Noise Control Act was developed and subsequent public hearings were conducted on the Islands of St. Thomas, St. Croix, and St. John. However, the Act contained several areas subject to disagreement and concern which prevented it from becoming enacted into public law. Efforts to secure an enforceable noise control law for the territory will continue despite current setbacks.

At present, the Division of Natural Resources Management of the Department of Conservation and Cultural Affairs has the responsibility to coordinate all noise matters of the islands. Presently, less than one person-year is devoted toward this end by an engineer from the Division's Air Pollution Control Program.

If future efforts are successful in establishing a noise abatement law, then it is anticipated that at least one professional from the Division will be warranted with full-time responsibilities to coordinate all noise-related activities. Additionally, it is expected that field inspectors in the air and pesticide programs will be trained to serve as certified field personnel for noise monitoring, inspection, and enforcement, in addition to their current duties and responsibilities.

III. PESTICIDES

The Pesticide Control Program is located within the Division of Natural Resources Management of the Virgin Islands Department of Conservation and Cultural Affairs. The Pesticide Control Program staff consists of a chief, a chemist, two inspectors, and a secretary. Support is received for the pesticide applicator certification program from the Virgin Islands Cooperative Extension Service, College of the Virgin Islands, which is the principal delivery mechanism for certification training. It is estimated by program administrators that there are about 80 major users of pesticides in the Virgin Islands.

Additions to the existing staffing structure of the Pesticide Control Program are not anticipated over the next five year period. Spokesmen for the program estimated that only 180 private applicators and 120 commercial applicators will be certified by October, 1977. It is also expected that approximately 15 in-house resort hotel applicators will require commercial certification. During interim periods of the four-year renewal/recertification period, it is expected that a total of 20 individuals (commercial and private) will require recertification on a per annum basis through 1981.

IV. POTABLE WATER

The primary source of potable water in the U.S. Virgin Islands is provided by six salt water desalination plants operated by the Water and Power Authority (WAPA), and treated and distributed by the Department of Public Works. Residences and commercial establishments maintain rainwater collection systems which, in a majority of instances, provide a substantial amount of the water requirements. The Division of Natural Resources Management of the Department of Conservation and Cultural Affairs has monitoring and certain regulatory authority over potable water samplings and analyses.

Current workforce statistics show that the Department of Public Works employs approximately 70 individuals charged with delivery of potable water to the citizenry of the islands. The Division of Natural Resources Management of the Department of Conservation and Cultural Affairs employs one engineer (part-time), one environmental technician, and one marine biologist in its water monitoring section. Four persons are employed in the Division's laboratory section.

Training for water supply operators has been classified by sources as deficient due to lack of funding. There is no mandatory certification for operators/distributors on the islands. No new career development is possible unless more monies become available.

V. RADIATION

The U.S. Virgin Islands have no radiation ordinances. Regulation and inspection of existing dental, medical, veterinary, and industrial X-ray units as well as all radioisotope users are conducted on a purely voluntary basis. Further, there are no nuclear power stations in the Territory.

The Director of the Division of Natural Resources Management coordinates all radiation efforts, and it is anticipated that by 1981 an additional half-time professional will be required to assist with the program.

VI. SOLID WASTE

Solid waste disposal is regulated and managed by the Division of Utilities and Sanitation of the Virgin Islands Department of Public Works (VIDPW). The Solid Waste Management Porgram is administered by a sanitation supervisor for solid waste disposal facilities and a sanitation supervisor for solid waste collections.

The solid waste collection workforce includes supervisors, heavy equipment operators, sanitation workers, truck drivers and weighmasters. These personnel are located on the islands of St. Thomas, St. John, and St. Croix. Solid waste disposal facilities are owned, operated, and maintained by the Department of Public Works. The total collection workforce is composed of 196 persons; the disposal facilities workforce is composed of 37 persons.

The Department of Public Works has recently commissioned a $20,000 study to assess the current situation in the territory's solid waste management system, and to develop overall plans and strategies to alleviate any problems that may exist. Due to the ongoing aspects of the solid waste planning study, workforce projections are not available at this time. Once this assessment is completed, it is believed that a proper management development strategy will be developed to keep workforce dimensions consistent with demands.

VII. WASTEWATER

Responsibility for administering the water pollution control program in the Virgin Islands belongs to the Division of Natural Resources Management. It currently employs 12 individuals and projects a staffing level of 15 by 1981. These additional employees will most likely be engineers. The Department of Public Works has responsibility for the proper operation and maintenance of all public wastewater disposal systems in the territory. This agency employs approximately 38 individuals; however, as complete information as to plans for new plants is unavailable, staff growth projections cannot be made.

There are no certification or training requirements to operate or maintain a wastewater treatment plant in the territory. Nevertheless, with the mandatory introduction of secondary treatment, it is expected that the level of training and education characteristics of the present workforce will, out of necessity, be substantially upgraded.

VIII. ENERGY

The Virgin Islands Energy Program (VIEP), located in the executive offices of the Governor, represents the territory's coordinative group for energy resources planning and coordination. The program is exploring alternate energy systems, effective energy utilization, and research and development necessary for conservation and use of renewable resources unique to this area. These efforts are funded under a grant from the Federal Energy Administration.

Most energy consumption on the islands is charged to the Hess Oil Virgin Islands Corporation and the Martin-Marietta Alumina Corporation. Together, they account for over 90 percent of imports and consumption; the Water and Power Authority accounts for approximately 5 percent. This situation exhibits the almost total reliance on industry for a successful effort to reduce the 1981 projected energy consumption by 5 percent.

THE VIRGIN ISLANDS OF THE UNITED STATES - SUMMARY

National Environmental/Energy Workforce Assessment
Pollution Control & Abatement Personnel
Projected Workforce Requirements (1976-1981)

Environmental Area	1976	1977	1978	1979	1980	1981	%/annum growth (average)
AIR[1]	33	33	33	33	33	33	0%
NOISE[2]	1	1	1	1	1	1	n/a
PESTICIDES[3]	323	343	363	383	403	423	6%
POTABLE WATER[4]	71	71	71	71	71	74	n/a
RADIATION[5]	1	1	1	1	1	2	n/a
SOLID WASTE[6]	232	--	--	--	--	--	n/a
WASTEWATER[7]	50	--	--	--	--	--	n/a
ENERGY[8]	--	--	--	--	--	--	n/a
TOTALS	711	--	--	--	--	--	n/a

[1]Estimate of workforce level in both public and private sectors. Future growth was projected by state and federal sources to be unlikely.

[2]Total includes one engineer from Air Pollution Control Program. Future growth is questionable unless a noise ordinance is established and funded.

[3]Includes 5 DNRM personnel and 3 extension service personnel, along with 315 pesticide applicators for which a 20 person/year growth rate is estimated.

[4]Private sector figures are unavailable.

[5]Private sector figures are unavailable.

[6]Growth estimates are not available due to ongoing aspects of a planning study to determine future requirement.

[7]Accurate workforce projections are not approachable due to a variety of variables.

[8]Workforce information is unavailable.

EDUCATION

There is only one college in the Virgin Islands: the College of the Virgin Islands in St. Thomas. The college, which was established in 1962, is operated on a semester basis and confers Bachelor's and Masters degrees. The 1975-76 enrollment was 1,918.

At the writing of this report, no response from the college had been received concerning the availability of an environmental or environmentally-related curriculum.

LEGISLATION

The environmental/energy legislation for Virgin Islands was obtained by request from various agency personnel and through various library references. Summaries of the legislation deemed most relevant to the eight subject areas of the workforce assessment were prepared, and are included in the respective state reports. The following list of laws represents virtually all environmental legislation for the state. Only certain of the following laws were summarized; the list is presented to show, by title, the kinds of laws which have been enacted.

Environmental Protection Law

Air Pollution Control Law

Pesticide Control Act

Oil Spill Prevention and Pollution Control Act

Water Pollution Control Law

National Environmental Energy
Workforce Assessment

Phase I

VIRGIN ISLANDS

Territorial Report

TERRITORIAL PROFILE

The U.S. Virgin Islands are located approximately 900 miles east of Miami, Florida. Formed by a series of volcanic eruptions in the Atlantic Ocean, the mountainous chain includes three large islands, St. Thomas, St. John, and St. Croix, and about fifty smaller, uninhabited islands. St.Thomas and St. John, part of the Puerto Rican bank of the Greater Antilles, lie on the geographical boundary between the Atlantic Ocean and the Caribbean Sea. St. Croix, the largest island, lies completely within the Caribbean Sea. Their nearest neighbors are Vieques, Culebra, and Puerto Rico, twenty miles to the west, and Tortola, British Virgin Islands, from which they are separated on the east by a one mile wide channel.

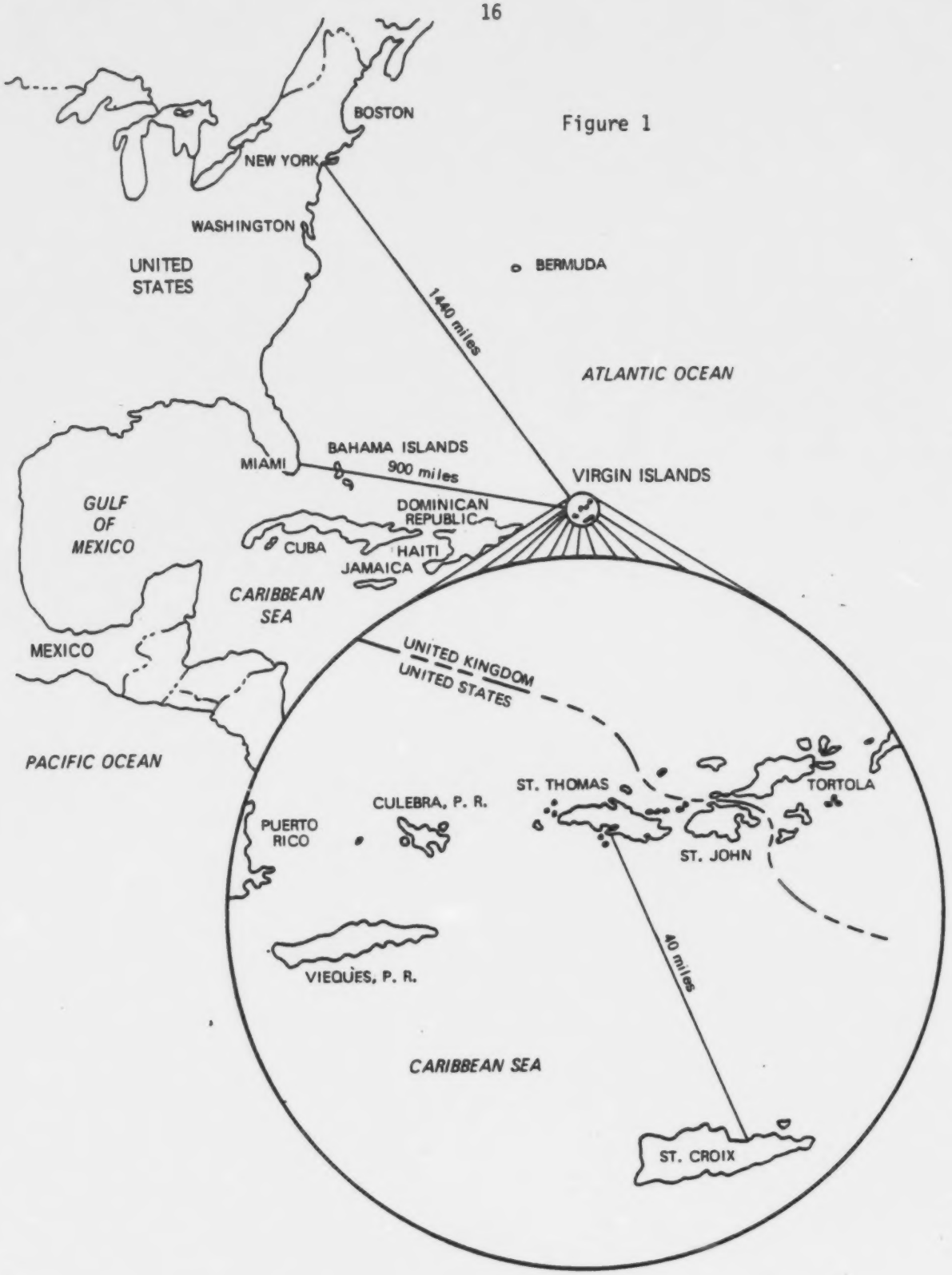
The maritime tropical climate of the Islands is characterized by generally fair weather, steady trade winds from the east, and a temperature which varies between 70 and 90 degrees,depending on the time of day and the season. The lifting of moist air over the mountains results in an average total rainfall of 50 to 60 inches at higher elevations and 20 to 30 inches at lower elevations, with an overall average of 44 inches per year. However, periods of deficient rainfall occur almost every year in some parts of the Islands, usually in late winter, spring and summer. Because the Islands have no large rivers or storage reservoirs, these drought periods are damaging to farming and dairying activities, the urban water supply, and the economy in general.

Since the Virgin Islands were discovered in 1493 by Christopher Columbus, they have alternately been under Spanish, British, Danish and American domination, and have been colonized by several European nations, many of whom were attracted to a potentially prosperous sugar industry. The United States began negotiating the purchase of the Islands from the Danish during the American Civil War, and finally bought them for $25 million during World War I in recognition of the strategic advantage their seizure would provide to the Germans. Currently a U.S. territory, the Virgin Islands are a complex mosaic of people of different races and geographic origins.

The population of the Virgin Islands has increased steadily since colonization began, nearly doubling between 1960 and 1970, and estimated at 105,376 in 1975. A substantial portion of the population is believed to be aliens, mostly West Indians, whose assimilation into the Virgin Islands community has been met with a myriad of political, economic, and social problems. About 80 percent of the population is of Negro descent.

The sunny, breezy climate of the Virgin Islands, along with its stunning scenery, "free port shopping", and an abundance of water sports, make tourism its largest industry. Principal exports from the Islands are watch movements, jewelry, rum, bay rum, wool textile products, and thermometers.

Figure 1



VIRGIN ISLANDS IN RELATION TO THE UNITED STATES AND TO EACH OTHER

Figure 2

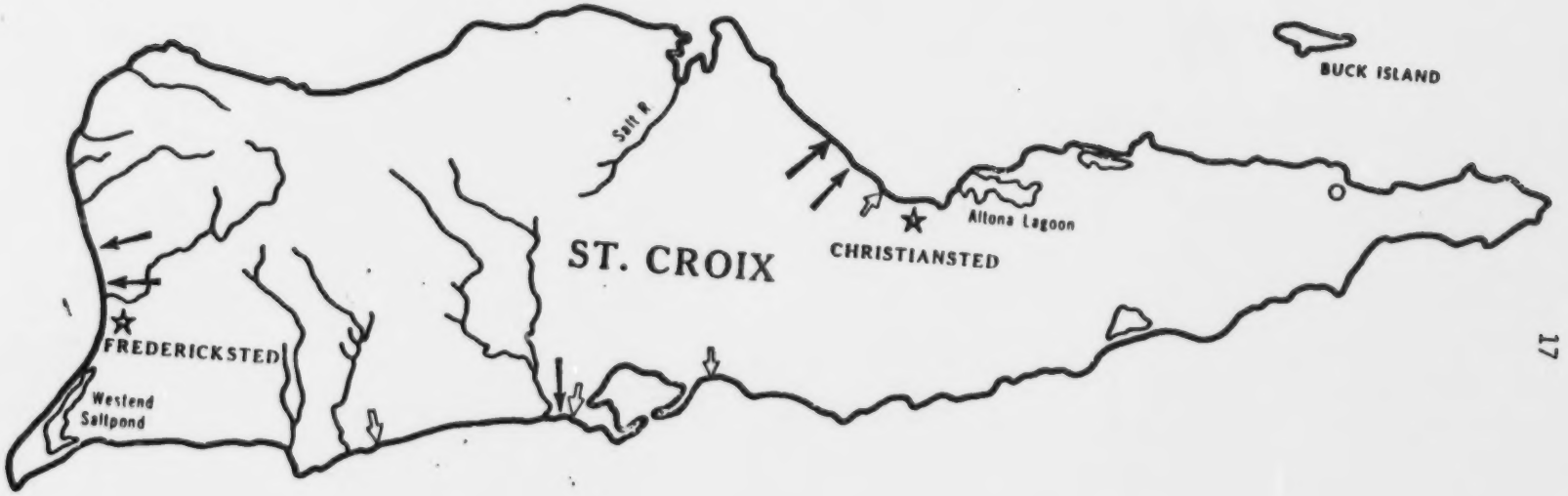

BUCK ISLAND
Salt R
Altona Lagoon
ST. CROIX
CHRISTIANSTED
FREDERICKSTED
Westend
Saltpond

Figure 3

LITTLE HANS LOLLIK ISLAND
HANS LOLLIK ISLAND
OUTER BRASS ISLAND
INNER BRASS ISLAND
THATCH CAY
ST. THOMAS
SAVANA ISLAND
ST. JOHN

POLLUTION CONTROL AND ABATEMENT AGENCIES

Environmental regulatory responsibilities are basically divided between two major agencies in the Virgin Islands. The Department of Conservation and Cultural Affairs oversees the territory's water quality program through administration of the construction grants program, the National Pollution Discharge Elimination System (NPDES) program, 208 areawide planning, and federally required water quality monitoring. This department also oversees the island's pesticide program in conjunction with the College of the Virgin Islands Cooperative Extension Service which aids in the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) for pesticide applicator certification training programs.

Responsibilities for management of the territory's air, noise, and radiation programs also rest with the department. All of these previously mentioned programs come under the auspices of the Division of Natural Resources Management, which is the environmental arm of the Department of Conservation and Cultural Affairs.

The Department of Public Works is responsible for implementing all programs which have significant local impact. These include the territory's solid waste program, water supply treatment and distribution program, and wastewater treatment facility operation and maintenance program.

Energy resources planning and policy matters in the territory are coordinated by the Virgin Islands Energy Program, located in the office of budget director of the Executive Offices of the Governor.

Pollution Control and Abatement Programs

I. AIR

A. Introduction

Air quality in the U.S. Virgin Islands currently meets all standards of ambient air quality mandated by the Clean Air Act. The program which has been instrumental in attaining this commendable compliance level is the Air Pollution Control Program of the territory's Department of Conservation and Cultural Affairs. This program samples for total suspended particulates (TSP) with high volume samplers and for sulfur dioxide with a number of sequential bubbler samplers located in the field, on a year-round basis. This is to ensure continuous compliance with existing air quality standards.

Major accomplishments of the program during Fiscal Year 1976 include:

1) The adoption of the revision to Air Pollution Regulation 204-26 "Sulfur Emission Compounds". The present regulation now allows the use of fuel on St. Thomas with a sulfur content of 2.0%. Water and Power Authority (WAPA), as a result of the change, reflects considerable savings due to the difference in cost between 2.0% sulfur fuel and the 0.5% sulfur fuel required previously.

2) Approval from the Regional Administrator, EPA Region II, to enforce delegation of authority for New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants (NSPS & NESHAPS).

3) Review and evaluation of Martin-Marietta Alumina Corporation's Expansion Program which is now completed and operating. The expansion increased MMA production capabilities by 18% to 455,000 tons per year.

4) Surveillance of St. Croix Petro Chemical Corporation which began production in March, 1976.

5) The review and evaluation of Martin-Marietta Alumina Bauxite Dust Control System installed in compliance with directions to reduce particulate emissions within the plant area.

(Source: Department of Conservation and Cultural Affairs, Report for Program Year 1976.)

Enforcement activities during this same period included the issuance of thirty-three notices of violation for visible emissions and twelve permits to construct/operate new or expanded facilities which directly affected, or would potentially affect, existing ambient air quality levels.

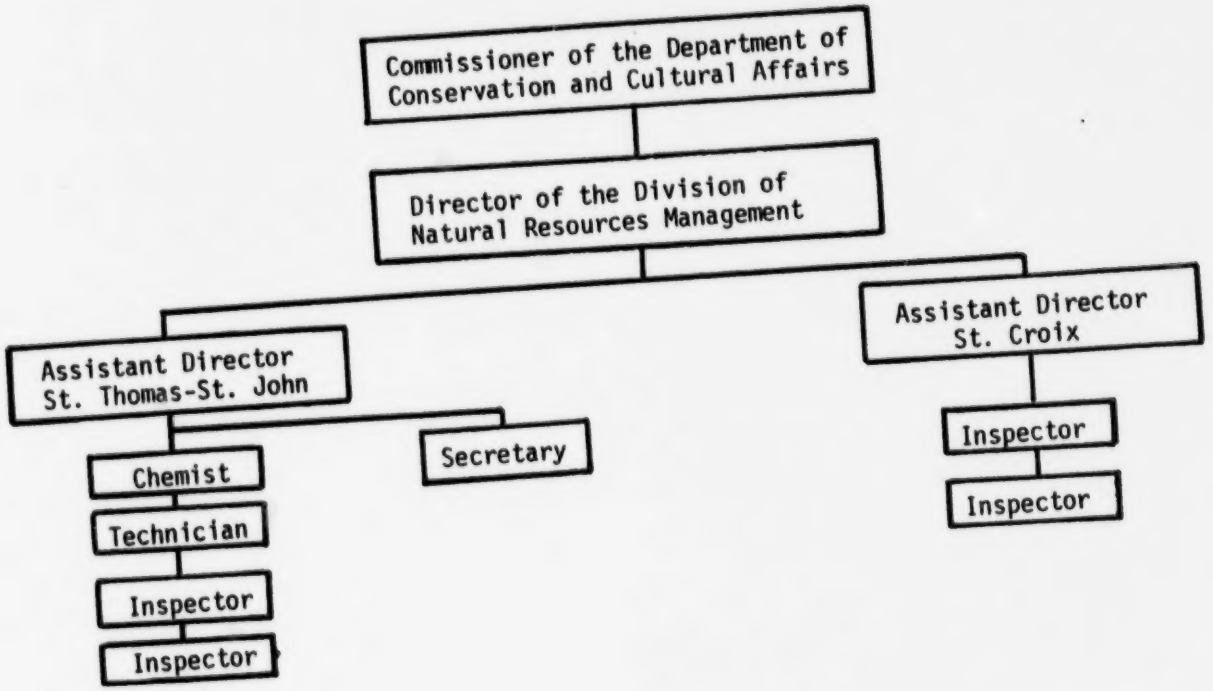
Most heavy industry affecting air quality is located on St. Croix, the two largest being Hess Oil Virgin Islands Corporation (HOVIC) which produces a variety of petrochemical products, and Martin-Marietta Alumina Corporation which processes aluminum ore into a non-reduced powder called alumina. In addition, there are several small chemical processing companies along with cement and aggregate storage and mixing plants.

B. Workforce Profile

The Air Program of the U.S. Virgin Islands is located with the Division of Natural Resources Management of the Department of Conservation and Cultural Affairs. It has the organizational structure depicted on the following page. The current staffing level of the air program is presented in the following table. Please note that all individuals listed do not work full-time on air matters. Due to the geographic nature of the islands and their size, it is a common practice for most

Figure 4

U.S. VIRGIN ISLANDS AIR POLLUTION ABATEMENT
AND CONTROL PROGRAM ORGANIZATION



division employees to share dual responsibilities to provide for maximum efficiency of effort in pollution abatement and control. It is foreseen that in the near future all inspectors employed by the division will have inspection responsibilities in all pollution areas regulated by the department.

TABLE I

U.S. VIRGIN ISLANDS DEPARTMENT OF
CONSERVATION AND CULTURAL AFFAIRS

Division of Natural Resources Management
Air Pollution Control Program
Current (1976) Staffing Level

Position	1976
Director	1
Assistant Director	2
Chemist	1
Technician	1
Inspector*	4
Secretary	1
TOTAL	10

*Includes one vacancy which will be filled.

In the private sector, HOVIC possess an environmental laboratory for compliance sampling. This laboratory performs functions in both air and wastewater, as well as product quality control which is a function of both. It is estimated that this division of HOVIC employs approximately 20 to 23 individuals at both the technical and professional level skilled in chemical engineering, laboratory procedures, pollution and product monitoring. The Environmental Quality Control Laboratory monitors all treatment facilities to ensure

maximum operational efficiency. Ambient air qualtiy is continuously monitored in and downwind of the plant to ensure that existing standards are met. Representatives of the Territory's air pollution control program feel that HOVIC operates a "model" refinery in all aspects.

The other major industry in the Virgin Islands, Martin Marietta Alumina Corporation, operates an air pollution abatement program. Its quality control laboratory continuously monitors all treatment and process facilities involved in the production of alumina to ensure maximum operational efficiency and minimal enviornmental contamination through discharge of particulates. Several technical individuals provide support.

C. Workforce Projections

Spokesmen for the air pollution control program of the U.S. Virgin Island indicate that over the next five year period there will be limited growth, if any, in the public or private sector. This situation is attributable to limited resources (land, potable water) which preclude industrial growth and is supported by the absence of an island labor force qualified to assume any technical or professional position which might open. Expansion of industry in the territory resulting in deterioration of air quality and more monitoring will most likely not occur. This, coupled with the fact that the Virgin Islands and American Samoa are the only regions which are currently achieving all national ambient air quality standards, exhibits the adequacy of the current labor force.

D. Training and Certification

The current budget for air pollution training for employees of the Air Pollution Control Program is $6,000. Generally, these funds are used to participate in courses and workshops offered by EPA's Air Pollution Training Institute (APTI) in both Region II (New York) and Research Traingle Park, North Carolina. Several courses addressing specific local needs, most notably sulfur dioxide and particulates, are scheduled to be offered by APTI on-site in the territory. This allows for greater access to training through direct delivery of services and has been heralded by program and local industry officials as a concerted commitment by EPA to ensure an adequately trained air pollution control workforce in the territory.

Employees obtain short duration training in instrumentation by those suppliers who provide air pollution monitoring and analysis equipment. Most sessions are one week long and have recently addressed operating techniques for an atomic absorption unit, a gas chromatograph, and an SO_2 analyzer. Generally, inspectors/technicians are given immediate access to these industry-sponsored training sessions.

A spokesman for the state program suggested the need for a special course on air pollution control and oil refinery emissions which, it is hoped, will be developed by APTI for delivery to air pollution control officials, public and private, within the Virgin Islands.

E. Career Potential

Based on existing workforce outlooks over the next five years, it appears that no new air pollution control career openings will occur within either the public or private sector. This estimate was derived from interviews and conversations with air pollution control officials located in the territory, as well as observations and judgements provided by EPA Region II professionals.

F. Conclusion

All national ambient air quality standards are being met on a continuous basis within the Virgin Islands of the United States through model public/private interaction far ahead of existing deadlines promulgated by EPA. The current workforce charged with maintaining and improving existing air quality levels appears to be trained adequately and officials express the desire to improve the current high level of expertise through industry- and island-specific training courses.

No new career openings are expected to develop over the next five year period. Thus, career opportunities will be limited and most likely will result only from attrition, although sources suggest that even this possibility is unlikely due to limited, alternative employment prospects in the territory.

II. NOISE

The Virgin Islands Government possesses no noise control statutes aimed at reducing industrial and residential noise through specific acoustical requirements. During FY 1976, a Noise Control Act was developed and subsequent public hearings were conducted on the Islands of St. Thomas, St. Croix, and St. John. However, the Act contained several areas subject to disagreement and concern which prevented it from becoming enacted into public law. Efforts to secure an enforceable noise control law for the territory will continue despite current setbacks.

At present the Division of Natural Resources Management of the Department of Conservation and Cultural Affairs has the responsibility to coordinate all noise matters of the Virgin Islands. Currently, less than one person-year is devoted toward this end by an engineer from the Division's Air Pollution Control Program assigned this responsibility.

If future efforts are successful in establishing a noise abatement law, then it is anticipated that at least one professional from the Division will be warranted with full time responsibilities to coordinate all noise-related activities. It is expected that field inspectors in the air and pesticide programs will be trained to serve as certified field personnel for noise monitoring, inspection, and enforcement in addition to their current duties and responsibilities. A training program for local law officials is also likely to be developed pursuant to the establishment of a noise abatement and control law.

During 1976, the Environmental Protection Agency provided assistance to the Division to conduct a noise level survey. The results are to become available during FY 1977.

III. PESTICIDES

A. Introduction

The Pesticide Control Program is located within the Division of Natural Resources Management of the Virgin Islands Department of Conservation and Cultural Affairs. It was initiated early in FY 1976 and shortly thereafter the Virgin Islands Pesticide Control Act was incorporated into existing laws to meet amended FIFRA requirements. The following were cited as major accomplishments of the territory's pesticide Program in 1976:

1. The Virgin Islands Territorial Plan for Certification of Commercial and Private Operators was completed, submitted to, and approved by the Regional Administrator of EPA.

2. Rules and Regulations required by the V.I. Pesticide Control Act were written. Public hearings on the regulations were held in Cruz Bay, Christiansted, Frederiksted, and Charlotte Amalie. No adverse comments were received. The regulations were forwarded to the Governor for approval and publication in the V.I. Register.

3. Training for Private Applicators was provided on all three islands. Forty-four were certified for application of pesticides. Training for commerical applicators was also provided on St. Thomas and St. Croix. Eighty-five commercial applicators were trained and certified.

(Source: Government of the Virgin Islands of the United States, Department of Conservation and Cultural Affairs, Report for Program Year 1976.)

The following list of program objectives and goals was provided by the program.

VIRGIN ISLANDS PESTICIDE CONTROL PROGRAM

Program Objectives and Goals - Immediate

1. To develop, publish and implement a Pesticide Enforcement Workplan.

2. To develop, staff and operate a Pesticide Laboratory to support the Enforcement Program.

3. To develop and train inspectors to implement and enforce the requirments of FIFRA, the Virgin Islands Pesticide Rules and Regulations, the Virgin Islands Territorial Plan for Certification of Commercial and Private Applicators of Restricted Use Pesticides.

4. To continue training and certification of commercial and private applicators using restricted use pesticides in the Virgin Islands.

5. To review and evaluate program functions and objectives to assure compliance with all federal and local statutes, regulations and grant requirements.

6. To prepare, develop and recommend changes to the Virgin Islands Pesticide Control Act and Regulations to fill existing needs within the Virgin Islands.

7. Develop and adapt simplified methods, and procedures for enforcement of federal and local requirements.

8. Identify Pesticide problems peculiar to the Virgin Islands and develop corrective actions for same.

Long Term Goals and Objectives

1. To continue development of a Laboratory Quality Assurance Program to assure accurate and repeatable test results; to assure compliance with EPA analytical methodology; to provide results using instrumentation and equipment traceable to known standards and to provide documentation acceptable by the courts.

2. To continue the securing of qualified professional personnel to permit the execution of the many technical and specialized activities required by both Federal and Virgin Islands Environmental Laws and Regulations.

3. To evaluate and review program accomplishments and efforts to determine priorities and to establish trends as they develop.

4. To maintain a library of technical and other information on Pesticide Control and provide a literature search as requested.

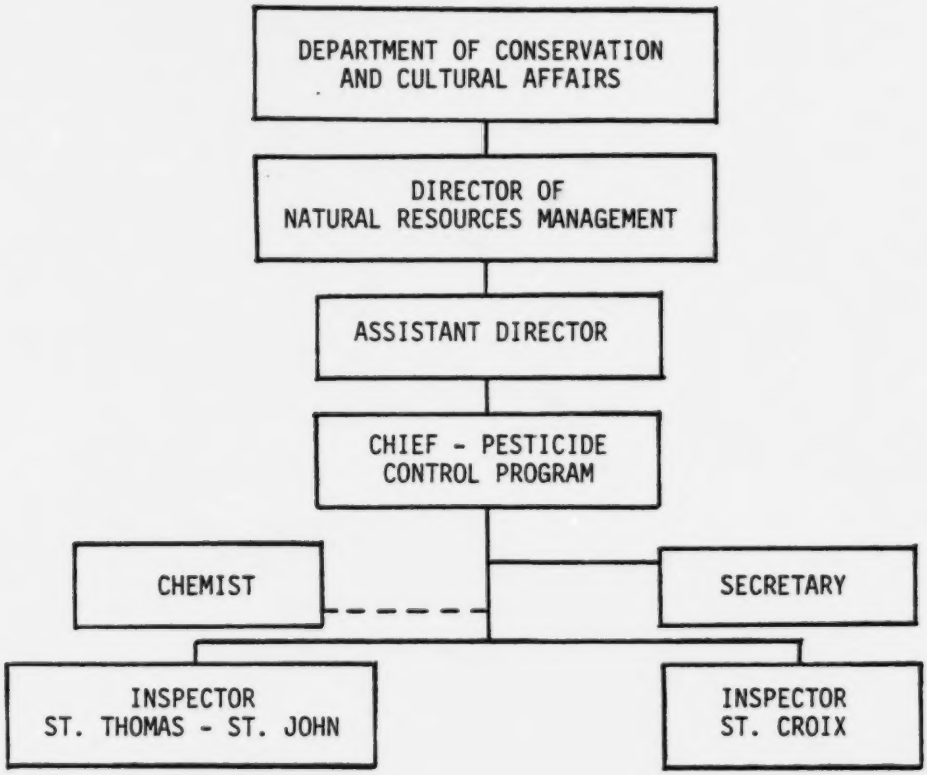
5. Planning, designing, and construction of additional laboratory facilities. The expansion is required to provide additional bench space and to separate areas for certain laboratory functions such as pesticide analyses, bacteriological analyses, etc.

(Source: Government of the Virgin Islands of the United States, Department of Conservation and Cultural Affairs, Division of Natural Resources Management, Pesticide Control Program; January, 1977.)

B. Workforce Profile

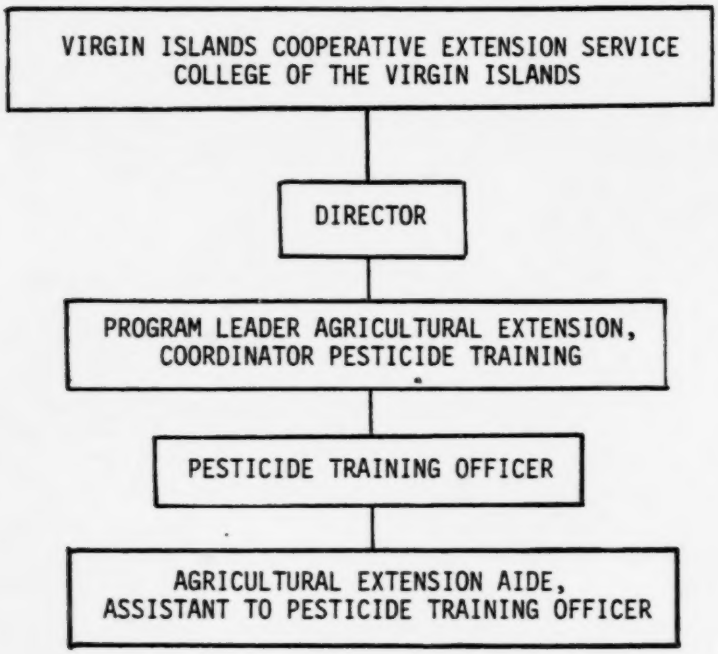
The Virgin Islands Pesticide Control Program has the following organizational structure.

VIRGIN ISLANDS PESTICIDE CONTROL PROGRAM ORGANIZATION



Support is received for the pesticide applicator certification program from the Virgin Islands Cooperative Extension Service, College of the Virgin Islands, which is the principle delivery mechanism for certification training. The following depicts the Service's organization relative to applicator certification.

VIRGIN ISLANDS COOPERATIVE EXTENSION SERVICE,
COLLEGE OF THE VIRGIN ISLANDS, PESTICIDE APPLICATOR
CERTIFICATION TRAINING PROGRAM ORGANIZATION



The Virgin Island Extension Service interfaces with the Division of Natural Resources Management, Department of Conservation and Cultural Affairs, through a cooperative agreement for certification of restricted use pesticide applicators. Major users of pesticides in the Virgin Islands total about 80 individuals and they are represented by Table II .

TABLE II

CURRENT (1976) MAJOR USERS OF PESTICIDES IN THE VIRGIN ISLANDS AND CORRESPONDING NUMBERS OF APPLICANTS

Government of the Virgin Islands	1977
St. Thomas - St. John	
Environmental Health	14
Agriculture	8
V.I. Housing Authority	1
U.S. Dept. of Agriculture	Biological Work Only
Public Works Dept.	9
St. Croix	
Environmental Health	4
Agriculture	5
V.I. Housing Authority	1
U.S. Dept. of Agriculture	4
Public Works Dept.	11
Extension Service	3
SUB-TOTAL	60
Pest Control Operators	
St. Thomas	
Rid - O - Pest	2
Oliver Exterminating	4
V.I. Maintenance Service	1
St. Croix	
Rid - O - Pest	3
Oliver Exterminating	6
ABC Janitors	2
Bug Away	1
HMS	1
SUB-TOTAL	20
TOTAL	80

C. Workforce Projections

Spokesmen for the Pesticide Control Program do not see the need for more staff and believe that any immediate, short term requirements or intense workloads can be met through supplemental assistance from personnel of the Air and Water Programs. If the industrial or the agricultural sectors whould grow abruptly, necessitating additional commercial applicators, then the program will move to supplement its current staff with additional permanent positions. However, this is not expected to occur due to the restricted nature of available agricultural land and zoning requirements.

Projections for private and commercial applicators have changed significantly since the Territory of the Virgin Islands first submitted its State Plan for Certification of Pesticide Applicators to EPA. In this plan it was anticipated that 350 private applicators and 200 commercial applicators would require certification. At this time it is estimated that only 180 private applicators and 120 commercial applicators will be certified by October, 1977. It is also expected that approximately 15 in-house resort hotel applicators will require commercial certification.

During interim periods of the four year renewal/recertification period, it is expected that a total of 20 individuals (commercial and private) will require certification on a per annum basis through 1981. During the 1980 renewal year, it is expected that 100 applicators will need recertification.

D. Training and Certification

The following summary of certification and training activities was provided by the pesticide control program director and serves to summarize current activities in this regard.

Certification training is done by way of cooperative agreement between the CVI Extension Service and the Department of Conservation and Cultural Affairs, Division of Natural Resources Management.

The training materials were developed by Mr. William Fitzwater on a grant from EPA. The basic format of material is 35mm slides with cassette tape synchronization. The publications by USDA and EPA "Apply Pesticides Correctly", "A Guide for Commercial Applicators", and "A Guide for Private Applicators" are used as the core manual respectively.

The training is done in a formal classroom setting. The sessions last about four hours and at the end of the training, a closed book test is given based on the aforementioned publications. Upon the completion of this session and testing, the Private Applicator is certifiable since there are no passing scores. However, the Commercial Applicator is given category/ies manuals for the respective category/ies for which he needs to show competence. The test for the category/ies is given with the manuals and they are taken home for an open book test.

Unlike the Private Applicator the Commercial Applicator has to pass the Core Manual with a 65 percent average and also the categories that he is desirous, with a 75 percent average.

As of the end of 1976, forty-three Private Applicators were certified. Several training sessions for Commercial and Private Applicators are being scheduled with the first being in mid March 1977.

More intensive efforts will be made to reach more Private Applicators, since it is felt that less than 50 percent of these applicators have not been reached, trained or certified.

Training, testing and certification has so far netted the following:

Commercial

Attendance Training and Testing	86
Certified participants	69
Participants not certified	17

Private

Certified 43

(Source: Government of the Virgin Islands of the United States, Department of Conservation and Cultural Affairs, Division of Natural Resources Management, Pesticide Control Program; January, 1977.)

Finally, the original State Plan for Certification of Pesticide Applicators estimated the number of commercial applicators to be certified by category as follows:

TABLE III

October, 1977, Number of Commercial Applicators to be Certified by Category

Category	October 1977
Agricultural Pest Control	
Plant	25
Animal	15
Ornamental and Turf Pest Control	45
Industrial, Institutional, Structural and Health Related Pest Control	40
Public Health Pest Control	50
Regulatory Pest Control	10
Demonstration and Research Pest Control	15
TOTAL	200

Substantial changes have occurred since this first projection and they are presented in Table IV.

TABLE IV

Updated October 1977, Number of Commercial Applicators to be Certified by Category

Category	October 1977
Agricultural Pest Control	
Plant	29
Animal	14
Ornamental and Turf Pest Control	19
Industrial, Institutional, Structural, and Health Related Pest Control	46
Public Health Pest Control	24
Regulatory Pest Control	14
Demonstration and Research Pest Control	8
TOTAL	154

E. Career Potential

Career potential in the field of Pesticides Use Control and Application in both the public and private sectors of the Virgin Islands appears to be limited, at best. New positions in the field will most likely be staffed through attrition with relatively few newly created positions arising (limited to the private sector). The territorial program anticipates no new additions to its current staffing level over the next five years. A more definitive assessment of career opportunities should become more and more apparent after the deadline for applicator certification is met in October, 1977.

Representatives of the Pesticide Control Program believe that because of "...terrain, water shortage(s), zoning requirements, (and) land shortages..." the use of pesticide applicators should not increase beyond current limited expectations.

F. Conclusion

The Territory of the Virgin Islands possesses several unique problems associated with pesticide use and control. Water shortages, a year round tropical climate, and topographic features are just a few variables which present the need for a well defined program unlike any within the continental United States. Additionally, professionals of the program stated that many of the pests which infest native crops do not appear on registered product labels, and thus use would necessarily conflict with label directions.

Despite these aforementioned problems, the program appears to be well on its way to establishing an exemplary educational and regulatory program with sufficient expertise to address any unusual situation that might arise.

No significant career potential exists in either the public or private sector outside of normal attrition replacement. The need to upgrade train the existing workforce is recognized and the pesticide program is currently engaged in improving the quality and knowledge of pesticide applicators throughout the three islands. Training sessions are conducted jointly by the Department of Conservation and Cultural Affairs and the Virgin Islands, Cooperative Extension Service.

IV. POTABLE WATER

A. Introduction

Within the United States Virgin Islands there exist no large underground or surface potable water supplies to serve the territory's population of 105,376 (1975 est.). The primary source of drinking water on the islands is produced by six salt water distillation (desalination) plants operated on both St. Thomas and St. Croix by the government. St. Thomas has four plants with a theoretical capacity of six million gallons per day. St. Croix has two plants with theoretical capacities of 3.25 million gallons per day. Dependable production (supply) falls short of these figures and is generally considered to be half of theoretical capacity due to repeated disrepair resulting in the inability to meet peakload demands.

Residences and commercial establishments maintain rainwater collection systems which in a majority of instances, provide a substantial amount of the water requirements. By law, all new buildings are required to provide independent cistern storage capacity. The Virgin Islands' annual precipitation averages about 44 inches per year.

The following public sources of water are available to the residents and businesses of the U.S. Virgin Islands.

TABLE V

PUBLIC WATER SOURCES IN THE U.S. VIRGIN ISLANDS

Location	Source
St. Croix	Desalination, wells
St. John	Desalinated water barged from St. Thomas. A well system is being developed to replace the barging.
St. Thomas	Desalinated water plans are being made to explore for well water in the east end of the island.

(Source: Assistant Commissioner, Department of Public Works)

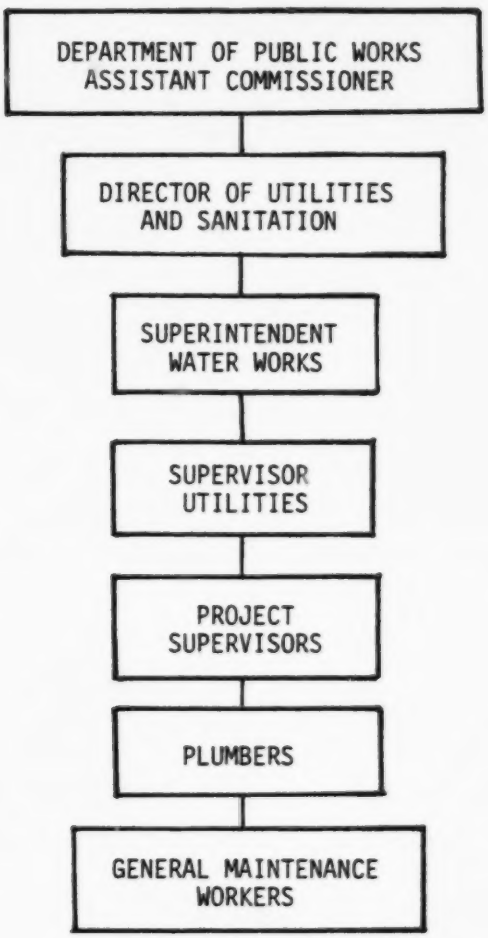
All water storage and distribution systems are operated by the Government of the Virgin Islands.

B. Workforce Profile

The Virgin Islands Department of Public Works (VIDPW) of the Government of the Virgin Islands is charged with the operation of all storage and distribution systems on the islands. The Water and Power Authority (WAPA) is charged with operation of all salt water distillation plants. The fresh water produced by WAPA is delivered to VIDPW for deactivation and treatment prior to final distribution as potable water to the public at large.

The Department of Public Works Water Supply Program has the following organizational structure.

THE VIRGIN ISLANDS DEPARTMENT OF PUBLIC WORKS WATER SUPPLY PROGRAM ORGANIZATION



(Source: Assistant Commissioner, VIDPW)

The following table represents the staffing level of VIDPW designated as responsible for ensuring the quality of the Virgin Islands public potable water supply. Please note that all employees work for the territorial government, as there is no local form of government in the individual U.S. Virgin Islands.

TABLE VI

DEPARTMENT OF PUBLIC WORKS

Potable Water Program
Current (1976) Staffing Level

Position	1977			
	St. Thomas	St. John	St. Croix	TOTAL
Engineer	1/3		1/3	2/3
Supervisor	4	1	6	11
Superintendent	1	0	2	3
Plumber	3	1	3	7
Water Plant Operator	10	0	4	14
Laborer	0	2	2	4
General Maintenance Worker	10	0	13	23
Meter Repairman	1	0	1	2
TOTAL	29 1/3	4	31 1/3	64 2/3

(Source: Assistant Commissioner, Department of Public Works)

The Division of Natural Resources Management of the Department of Conservation and Cultural Affairs has monitoring and certain regulatory authority over both potable water and wastewater quality. The Water Monitoring Section of this Division employs one engineer (part-time), one environmental technician, and one marine biologist. Laboratory capabilities are also provided by the Division. This staff includes one laboratory director, two environmental technicians, and one chemist. These individuals share responsibility for both drinking water and wastewater analyses. The following table summarizes the Division of Natural Resources Management's potable water effort.

TABLE VII

DEPARTMENT OF CONSERVATION AND CULTURAL AFFAIRS

Potable Water
Current (1977) Staffing Level[1]

Position	1977
Water Monitoring Section	
Engineer[2]	1
Environmental Technician	1
Marine Biologist	1
SUB TOTAL	3
Laboratory	
Laboratory Director	1
Environmental Technician	2
Chemist	1
SUB TOTAL	4
TOTAL	7

[1]All positions share responsibilities in both potable water and wastewater.

[2]Also has responsibilities other than potable water and wastewater.

C. Workforce Projections

Specific projections for VIDPW's potable water effort were not readily available, although it was felt by a Department spokesman that a chemist was needed to rectify the erosive problems associated with the storage of "active" water delivered by WAPA to DPW storage tanks. Sources indicated that additional professional and technical personnel are needed to operate and maintain the water treatment systems of the Department as this area is experiencing difficulty. The regulating and monitoring responsibilities of the Division of Natural Resources may require the employment of an engineer and two environmental technicians by 1981.

D. Training and Certification

Current activities in this area have been said to be severely deficient due to lack of available resources to devote to workforce development. Water storage, treatment, and distribution personnel of the Department of Public Works are not subject to any sort of mandatory certification. It was stated, however, by the Assistant Commissioner of VIDPW that, "...training is definitely needed on various levels for supervisors and operators."

E. Career Potential

Career potential in potable water systems management and operation appears to be somewhat limited over the next 5 years due to resource constraints which most likely will not translate existing needs into permanent careers. In the Division of Natural Resources Management, specifically, it appears likely that one professional engineer and two technicians will be secured to augment current program functions in monitoring and regulation. No new career development is possible unless additional monies become available.

F. Conclusion

"The major problem being experienced with the potable water system includes an inadequate source of potable water and a distribution system in need of repair."

- Assistant Commissioner, Virgin Islands Department of Public Works

The preceding observation summarizes the major difficulties which the Virgin Islands faces today in supplying potable water to its population, transient and permanent. There exist no expedient solutions to the present situation other than financial assistance by the federal government. However, upgrading existing efficiency of operation does appear to be a viable alternative to alleviate immediate short term water problems while long term solutions are developed and initiated. Financial resources above and beyond what is currently available will be required and should be utilized to improve the current expertise of the potable water workforce in addition to improving the reliability of existing hardware. Problems faced by the Virgin Islands today in supplying a safe and reliable supply of water consistent with the growing demands of its inhabitants could very well be a prelude to similar difficulties to be experienced by communities in the United States with dwindling water supplies. Perhaps the Virgin Islands could be used as a model, if supported appropriately, for other areas of the U.S. which may eventually face a similar confrontation with demand challenging supplies.

V. RADIATION

The U.S. Virgin Islands have no radiation ordinances. Regulation and inspection of existing dental, medical, veterinary, and industrial X-ray units as well as all radioisotope users are conducted on a purely voluntary basis. There are no nuclear power stations in the Territory.

The following table presents a current breakdown of existing X-ray machines on the islands of St. Thomas, St. Croix, and St. John.

TABLE VIII

Current (1976) Dental and Medical X-Ray Units in Operation

TYPE	NUMBER OF UNITS			
	St. Croix	St. John	St. Thomas	TOTAL
Dental	8	1	11	20
Medical	4	--	4	8
Veterinary	--	--	1	1
Industrial	1	--	--	1
Radio-Isotope Users	2	--	--	2
TOTALS	15	1	16	32

An agreement exists with the Nuclear Regulatory Commission to "assist in the inspection of the watch assembly plants and other radio-isotope users where workers may be exposed..."

The Director of the Division of Natural Resources Management coordinates all radiation efforts, and it is anticipated that by 1981 an additional half-time professional will be required to assist the Director in this regard. Currently, all radiological surveys are contracted out to private/public concerns.

VI. SOLID WASTE

A. Introduction

Solid waste disposal in the United States Virgin Islands is regulated and managed by the Division of Utilities and Sanitation of the Virgin Islands Department of Public Works (VIDPW). The outstanding problem associated with solid waste management of the territory involves the absence of environmentally acceptable solid waste disposal facilities on both the islands of St. Thomas and St. John. St. Croix, however, has established a sanitary landfill site which currently serves its island population in an environmentally safe manner.

In recognition of this shortcoming, the Department of Public Works has recently commissioned a $20,000 study to assess the current inadequacies of the territory's solid waste management system, and develop overall plans and strategies to alleviate the problems which currently exist. This solid waste management planning study was made possible through funds made available by the U.S. Environmental Protection Agency and, according to the Assistant Commissioner of VIDPW, whould provide the necessary detailed information on solid waste management, "for use in determining the route that should be taken in this particular field."

Finally, an overview of solid waste disposal methods employed by the three major islands of the U.S. Virgin Island territory is provided in the following table.

TABLE IX

CURRENT (1977) VIRGIN ISLAND DEPARTMENT OF PUBLIC WORKS SOLID WASTE DISPOSAL METHODS UTILIZED WITHIN THE TERRITORY

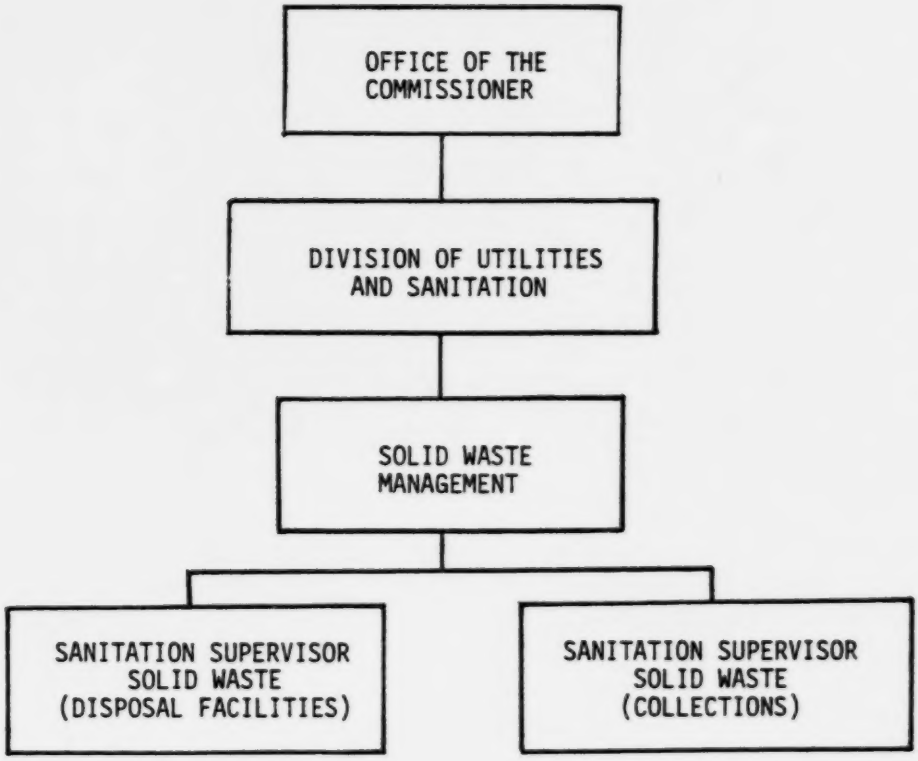
Territorial Region (Island)	Disposal Method
St. Croix	Sanitary Landfill
St. Thomas	Landfill (Site not yet completed; three years overdue.)
St. John	Incineration and Landfill

These sites do not receive hazardous wastes. Materials recovery is not performed, but has been proposed by private firms. The Solid Waste Management Study currently being prepared should provide information on the feasibility of adopting some resource recovery methods in the Territory.

B. Workforce Profile

The Virgin Islands solid waste management program has the following organizational structure.

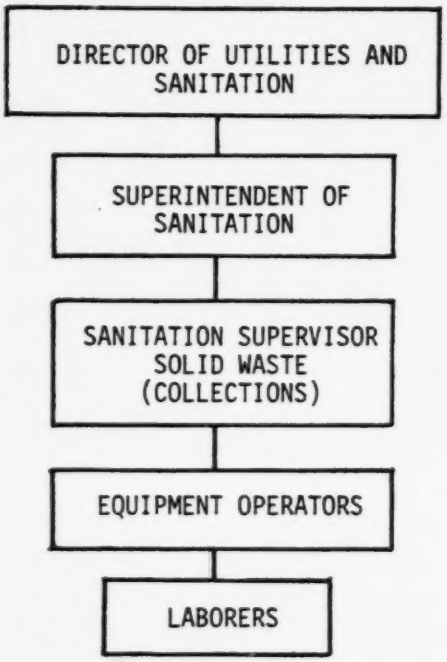
VIRGIN ISLAND SOLID WASTE PROGRAM


OFFICE OF THE COMMISSIONER
DIVISION OF UTILITIES AND SANITATION
SOLID WASTE MANAGEMENT
SANITATION SUPERVISOR SOLID WASTE (DISPOSAL FACILITIES)
SANITATION SUPERVISOR SOLID WASTE (COLLECTIONS)

Included as responsibilities of the Division of Utilities and Sanitation are potable water storage and distribution and wastewater collection and treatment. As mentioned earlier, all solid waste facilities and personnel are operated and employed directly by the Government of the Virgin Islands. This includes the collection-related workforce and on-site disposal facility personnel.

Solid waste collection in the territory has the following organizational structure.

VIRGIN ISLANDS SOLID WASTE COLLECTION ORGANIZATION



The following table depicts a current breakdown of employees involved in all solid waste collection services.

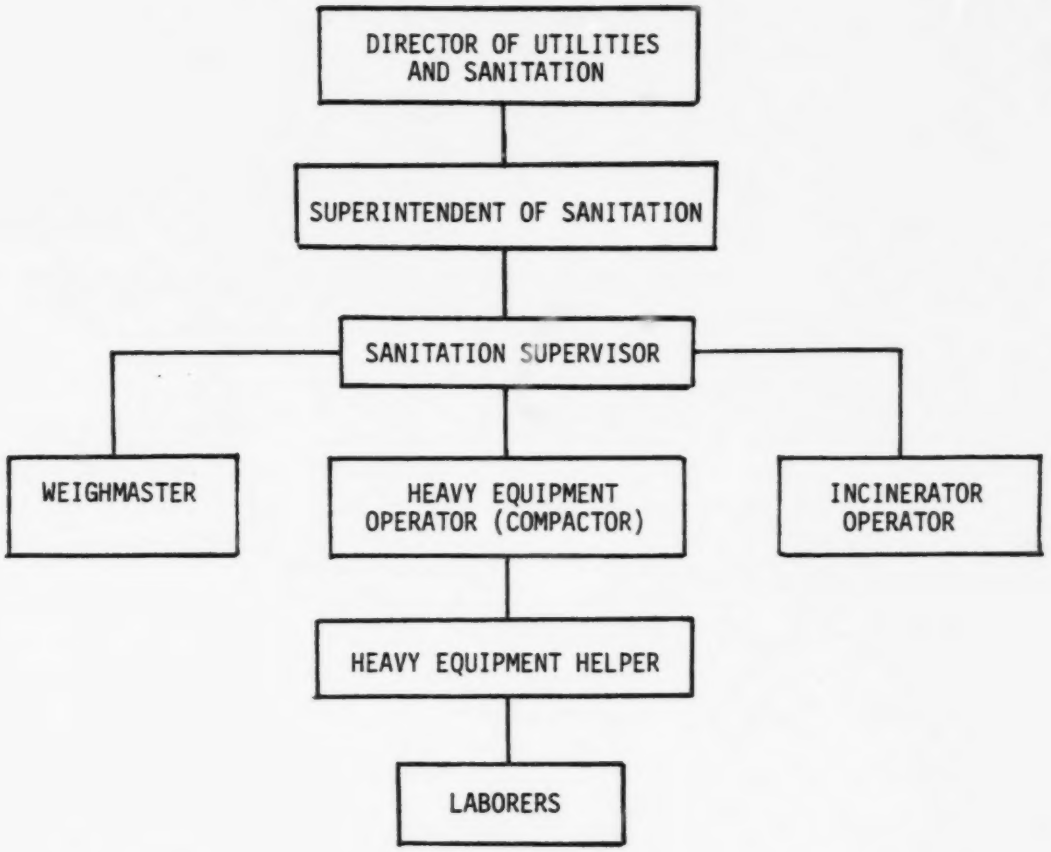
TABLE X

DEPARTMENT OF PUBLIC WORKS
Solid Waste
Current (1977) Staffing Level

Position	St. Thomas	St. John	St. Croix	TOTAL
Engineer	1/3		1/3	2/3
Supervisor	5	1	6	12
Heavy Equipment Operator	11	2	8	21
Sanitation Worker (Collector)	53	9	60	122
Truck Driver	11	2	22	35
Weighmaster	2	2	1	5
TOTAL	82 1/3	16	97 1/3	195 2/3

Solid waste disposal facilities are owned, operated, and maintained by the Department of Public Works. The operation of these sites has the following organizational structure.

VIRGIN ISLANDS SOLID WASTE DISPOSAL
FACILITIES OPERATIONAL ORGANIZATION



The current staffing level of landfill and incinerator operation and maintenance is shown in the following table.

TABLE XI

DEPARTMENT OF PUBLIC WORKS

Solid Waste Disposal Facilities
Current (1977) Staffing Level

Position	St. Thomas	St. John	St. Croix	TOTAL
Sanitation Supervisor	1	1	1	3
Heavy Equipment Operator	11	2	8	21
Weighmaster	2	0	1	3
Incinerator Operator	0	1	0	1
Laborer	4	1	4	9
TOTAL	18	5	14	37

C. Workforce Projections

Due to the ongoing aspects of the Virgin Islands Solid Waste Planning Study, workforce projections are not approachable at this time. However, once this assessment is completed, it is believed that a proper workforce development strategy will be developed to keep workforce dimensions consistent with demands.

D. Training and Certification

At this time no formal training or certification programs are in existence, although the need for training has been expressed quite emphatically. The ongoing Solid Waste Management Study should provide the Department of Public Works with a basis for developing a definite training strategy for all solid waste personnel employed by the program.

E. Career Potential

Career potential will remain unknown until the solid waste planning study is completed. Until the study is submitted, specific career development areas cannot be speculated upon.

F. Conclusion

The United States Virgin Islands territory is currently assessing its solid waste management organization from a variety of standpoints including, but not limited to, training needs, operation efficiency, workforce needs, and future planning strategies. Once this study is concluded, it is expected that solid waste management throughout the islands will be upgraded substantially in the area of human resources management, as well as physical disposal capabilities.

The Resource Conservation and Recovery Act of 1976 (PL 94-580) is also expected to impact this island community in the form of both unique pilot and model projects. Due to the finite area for land disposal of wastes and the rising cost of imported goods, it appears as if resource recovery as well as source reduction activities will be initiated under PL 94-580 if funding can be obtained. The Territory is fast approaching the realization that with inflated energy costs and limited disposal areas, both resource recovery and resource conservation activities need to be implemented in the very near future.

VII. WASTEWATER

A. Introduction

Coastal waters of the U.S. Virgin Islands are subject to disposal of most treated and untreated liquid wastes from municipal and nonmunicipal sources. Principle sources of coastal water pollution include domestic sewage, storm runoff, industrial discharges, and marine discharges. Areas currently affected by varying pollutant levels include the harbors of Charlotte Amalie, Christiansted and Fredericksted. Additionally, the southern coast of St. Croix is also plagued by polluting discharges due to a heavy industrial concentration in the area. However, exemplary progress is being made to bring all coastal waters into compliance with federal water pollution control standards.

Sewage disposal techniques utilized throughout the islands include:

1. Sanitary sewers with laterals, interceptors, pumping stations, and primary treatment plants, discharging to the sea through ocean outfalls. This system is used in the town of Charlotte Amalie, Christiansted, and Frederiksted.
2. Septic tanks with seepage pits or drain field. This is the chief method of sewage disposal used in the suburban and rural areas, as well as in small divisions.
3. Pit Privies. These are found in the rural areas of St. Thomas and St. Croix, in St. John, in Frederiksted, and

the hilly area of Charlotte Amalie and Christiansted.

4. Sanitary sewers with complete package sewage treatment in "extended-aeration plants, followed by polishing ponds". This is the system required and used in all new housing, hotel and condominium developments.

(Source: Department of Conservation and Cultural Affairs, Division of Natural Resources Management, Report for Program Year 1976.)

The following municipal and private treatment plants are currently in operation or planned for the territory:

St. Croix: 1 Municipal Primary Treatment Plant (plans for upgrading to secondary)
Lift stations
1 Tertiary Pilot Plant
Package Plants (public)

St. John: 1 Package Treatment Plant (privately owned)
1 Proposed Tertiary Treatment Plant

St. Thomas: 1 Municipal Primary Treatment Plant (plans for upgrading to secondary)
Lift Stations
Package Plants (private and public)
1 Proposed Secondary Treatment Plant

(Source: Assistant Commissioner, Virgin Islands Department of Public Works)

B. Workforce Profile

Responsibility for administering the Virgin Islands water pollution control program belongs to the Division of Natural Resources Management of the Department of Conservation and Cultural Affairs. The Division reviews plans and specifications for new and upgraded wastewater treatment systems; procures all outside consultants and contractor required for the system development and construction; and supervises and monitors all construction activities to insure compliance. Additionally, responsibility for 208 planning and NPDES permits rests with officials of this group. A pilot advanced wastewater treatment plant (tertiary) is also operated by the Natural Resources Management Division on the island of St. Croix under a demonstration grant from EPA. Plant capacity is rated at 350,000 GPD and effluents are injected subterraneously to recharge existing ground water supplies in a move toward practical ground water reclamation.

The staffing level for the Division of Natural Resources Management is depicted in Table XII.

TABLE XII

DEPARTMENT OF CONSERVATION AND CULTURAL AFFAIRS
Wastewater Division
Current (1977) Staffing Level*

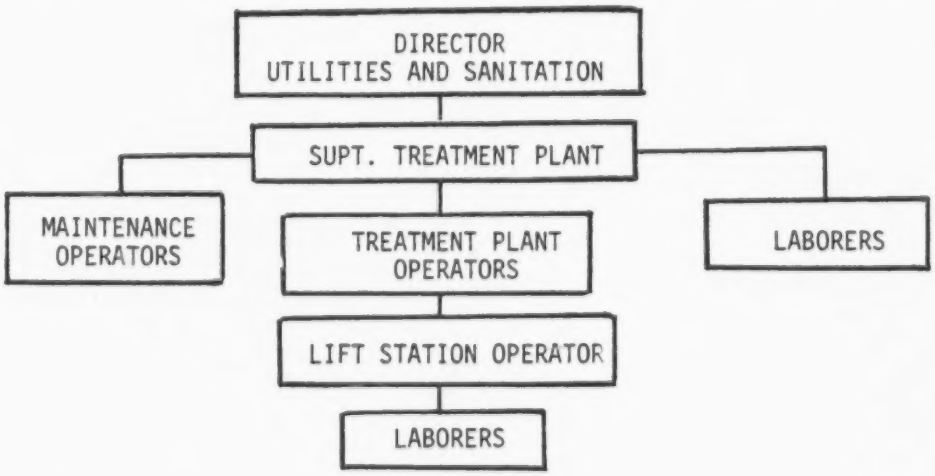
POSITION	1977
Director	1
Lab Director	1
Engineer	2
Chemist	5
Marine Biologist	2
Environmental Tech.	1
TOTAL	12

*Included are employees of the Division's Laboratory and Water Monitoring Section who have responsibilities in both water and wastewater. Additionally, the Director has part-time responsibilities in air, noise, pesticides, and radiation.

The Department of Public Works has prime responsibility for the proper operation and maintenance of all public wastewater disposal systems in the territory. The one exception is the advanced wastewater treatment plant operated by the Department of Conservation and Cultural Affairs on St. Croix. This arrangement emanates from the initial demonstration phase of the facility, after which it is expected that the Department of Public Works will assume full operational responsibility.

The organization of the Department is as follows.

DEPARTMENT OF PUBLIC WORKS WASTEWATER PROGRAM ORGANIZATION



Source: Assistant Commissioner, Department of Public Works

Table XIII depicts the staffing level of the Department's wastewater program. Please note that due to the absence of local government in the Virgin Islands, the Department of Public Works, which is a branch of the Territorial Government, directly employs all plant and lift station operators and laborers.

TABLE XIII

DEPARTMENT OF PUBLIC WORKS

Current (1977) Wastewater Staffing Level

POSITION	1977			
	St. Thomas	St. John	St. Croix	TOTAL
Engineer	1/3		1/3	2/3
Superintendent	1	0	1	2
Maintenance Engineer	1	0	1	2
Operator (Treatment Plant)	5	0	11	16
Operator (Lift Station)	3	0	3	6
Laborer	4	0	4	8
Maintenance Worker	1	0	3	4
TOTAL	15 1/3	0	23 1/3	38 2/3

(Source: Assistant Commissioner, Department of Public Works)

C. Workforce Projections

"The inavailability of complete conformation on plans for new plants to the Public Works Department at this time, makes it impossible to provide information on complete staffing needs, etc."

- Assistant Commissioner, Department of Public Works

Within the next five years it appears that there will be constructed two more secondary treatment plants in the Virgin Islands; and it is expected that existing primary treatment plants will be upgraded. However, as is evident by the above statement by the Assistant Commissioner of the Department of Public Works, the lack of specific information concerning workforce requirements for these new and upgraded facilities prevents definitive workforce forecasting.

Officials of the Division of Natural Resources Management estimated over the next five years they will require two or three additional engineers to assist primarily in the territory's NPDES program; however, state funding shares are not expected to increase during this same period, thus subsidies to enable these workforce increases for the Division must necessarily emanate from increased federal assistance. Otherwise, workforce increases through 1981 will most likely not materialize.

D. Training and Certification

There are presently no certification requirements for treatment plant operators in the U.S. Virgin Islands. Previous attempts to encourage voluntary training by enrollment of operators into both

of the Sacremento Wastewater Training Correspondence Courses met with only limited success. Twenty participants began the training; only three or four chose to complete the entire course of study.

Currently,most employees of the treatment plants have had only limited formal education. With the advent of secondary treatment requirements all employees will require extensive upgrade training. It is the present philosophy of the department to encourage cross-training at all levels as low-skilled employees generally assume positions vacated by their superiors. This preparedness allows a normal transition of plant operation without crisis.

The Division of Natural Resources Management addressed a variety of groups to inform the public of their responsibilities in water pollution control. Employees also attended the following professional meetings:

1) Water Pollution Control Federation Annual Conference
2) Association of State and Interstate Water Pollution Control Administrators
3) EPA sponsored conferences on oil spill responsibilities

E. Career Potential

Due to the uncertain nature of future workforce growth in the Department of Public Works, career potential cannot be accurately identified, although it is believed that as a result of secondary treatment installation, new careers will necessarily

require a level of education and/or experience above what is currently required. Career potential within the Division of Natural Resources Management is undefinable at this time.

F. Conclusion

The wastewater programs of the Government of the Virgin Islands operate in a mutually complementary fashion and over the past seven years have brought the coastal waters of the territory into compliance with existing federal standards and requirements through upgrading of effluent discharge regulations.

The workforce currently devoted to wastewater treatment is employed entirely by the territorial government, except in cases of private package plant operators. Although future growth in this workforce will be limited, the need for extensive upgrade training and education is critical if current and future capabilities are to be improved. At the moment, due to lack of available financial resources, this gap will remain, unless federal assistance is forthcoming.

VIII. ENERGY

The Virgin Islands Energy Program (VIEP), located in the Office of the Budget Director of the Executive Offices of the Governor, represents the principal focus for energy resources planning and coordination in the U.S. Virgin Islands. The goals of the program include the following:

1) Establish the capability to undertake long-range analysis and planning for alternate energy systems which are appropriate to the Virgin Islands situation;

2) Develop means for projecting, monitoring, and directing total energy utilization under changing local needs and world market conditions;

3) Support the research and development efforts necessary for conservation and renewable resource energy systems unique to the Virgin Islands and essential to the preservation of other resources such as people and the natural environment.

(Source: Virgin Islands State Energy Conservation Plan, 1977)

The current major thrust of energy planning is directed toward an Island-wide Energy Conservation Program grant recently awarded to the territory by the Federal Energy Administration. Its goal is to reduce energy consumption by the year 1980 to 95 percent of the current projected consumption. An overview of the various program measures mandated by the conservation plan appear in the chart on the following page. Additionally, the various functions of each program measure and the delegation of authority are included.

Figure 5 EXCERPTS FROM VIRGIN ISLANDS ENERGY CONSERVATION PLAN, 1977

Program Measures	Policy Planning	Performance Monitoring	Staff Services	Inter-Agency Coordination	Technical Assistance
Thermal Efficiency	VIEP	VIEP	TAC/Other Agencies	VIEP/Other Agencies	Planning Office/ Dept. Public Works/TAC
Lighting Efficiency	VIEP	VIEP	TAC/Other Agencies	Dept. Public Works	TAC/Dept. Public Works
Procurement Standards	VIEP/Procure-ment Council	VIEP	Dept. Property & Procurement	Procurement Council	TAC/Dept.Property & Procurement
Carpool/ Vanpool	VIEP	VIEP	VIEP/Private Employers	N/A	TAC
LTOR	VIEP	VIEP	Office of High-way Safety	N/A	VIEP
Industrial Conservation	VIEP/Energy Advisory Comm.	VIEP	VIEP/Energy Advisory Comm.	Energy Advisory Committee	Economic Policy Council/TAC
Utility Measure	VIEP/WAPA	VIEP	WAPA	WAPA Board	WAPA
Alternate Sources	VIEP/TAC/ ERDA	VIEP	N/A	VIEP	TAC

Abbreviations: TAC, Technical Advisory Contracts or Consultants
ERDA, Energy Research and Development Administration
VIEP, Virgin Islands Energy Plan
WAPA, Water and Power Authority
LTOR, Left Turn on Red

Source: Virgin Islands Energy Conservation Plan, 1977.

Currently, most energy consumption is dominated by two large industries located on the Island of St. Croix: the Hess Oil Virgin Island Company (HOVIC), and the Martin-Marietta Alumina Corporation. Hovic accounts for approximately 90 percent of energy imports and consumption in the entire territory. The Water and Power Authority (WAPA), an executive agency which operates the islands' desalination and electrical generating plants, together with Frenchman's Reef (a large resort hotel), are the largest non-industrial users. However, their total energy consumption combined is equal to the 5 percent reduction in the 1980 projected energy requirements. This in itself exhibits the dependency which the Virgin Islands have upon successful conservation measures implemented by HOVIC and Martin-Marietta in order to meet the consumption reduction goal for 1980. The public and non-industrial private sector can effect a 5 percent sector reduction; however, on the islands' overall energy balance sheet, this improvement will have a negligible effect without industrial cooperation. The figures following this section portray energy consumption and imports characteristic of the U.S. Virgin Islands public and private sector.

The general goals of the Virgin Islands Energy Conservation Plan and the commitment of the territorial government is the pursuit of practicable technologies for alternate energies and the independence from over-extended petroleum imports which will result from implementation of these technologies. Nevertheless, in order to effect an efficient energy use program, the following unique problems of the territory must be focused upon and integrated into the overall conservation strategy:

1) An extreme dependency on outside resources;

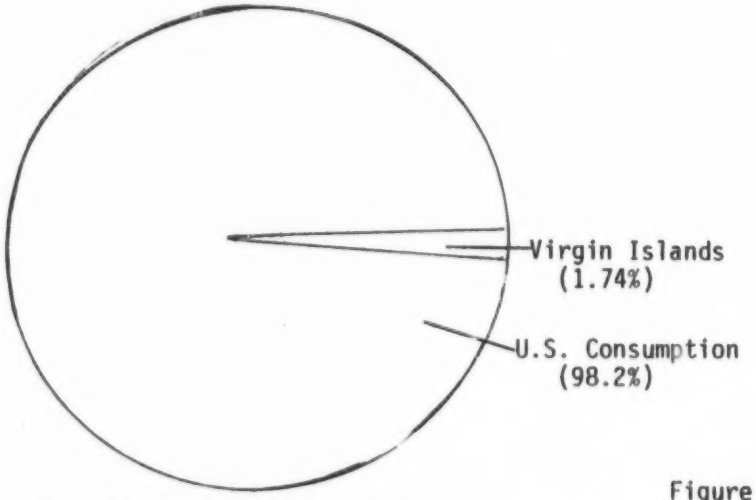
2) The small size of the islands in geographic and population terms, accented by fragmentation and divisions between the islands;

3) The dependence of the islands on a single dominant industry;

4) The extremely high rate of growth experienced in the past 25 years, resulting in a moderate level of income (65 percent of the mainland average and high population densities on the major islands; and,

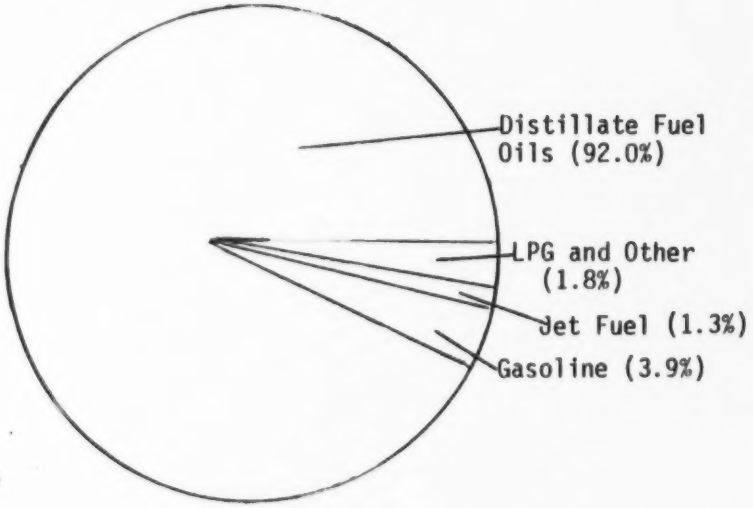
5) The preservation of the natural beauty of the environment.

Figure 6



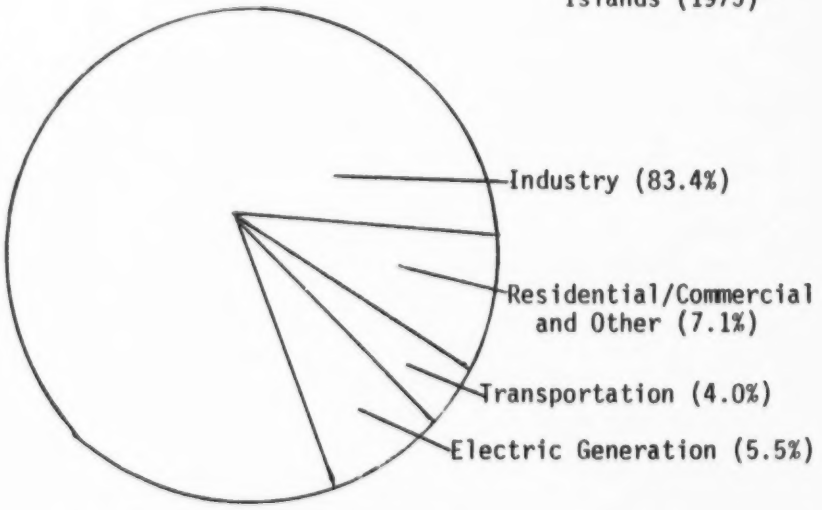
V.I. Energy Consumption as a Percentage of U.S. Consumption (1975)

Figure 7



Fuel Imports to the Virgin Islands (1975)

Figure 8



Energy Consumption by Economic Sector (1975)

(Source: U.S. Virgin Islands Energy Conservation Plan, 1977)

Selected Post Secondary Institutions With Formal Environmental Energy Programs

Information is currently lacking on the availability of environmental degree programs in the Virgin Islands. The College of the Virgin Islands, in Saint Thomas, is the only college in the Islands. The College, which was established in 1962, offers degree programs on both the Bachelor and Master level. In the academic school year 1975-76, 1,918 students were enrolled.

Legislation

VIRGIN ISLANDS GENERAL

TITLE:

Environmental Protection Law
Virgin Islands Code 12-531

PURPOSE:

To control land development and conserve the land and water resources of the territory.

DEFINITIONS:

ADMINISTERING AUTHORITY:

Water and Soil Conservation District

AUTHORIZATIONS:

To develop an environmental protection program;
To issue regulations controlling land development and change;
To approve all Earth Change Plans and issue permits;
To enforce the act.

PROHIBITED ACTS:

To fail to obtain Earth Change permit;
To violate other regulations.

PENALTIES:

Fines of up to $5,000 or one year imprisonment.

VIRGIN ISLANDS AIR

TITLE:

Air Pollution Control Law
Virgin Islands Code 12-201

PURPOSE:

To provide for the prevention and abatement of air pollution to protect the atmosphere of the territory.

DEFINITIONS:

1. Air pollution
2. Air contaminant
3. Person
4. Commissioner

ADMINISTERING AUTHORITY:

Department of Conservation and Cultural Affairs

AUTHORIZATIONS:

To act as the lead agency in air pollution matters;
To develop a comprehensive air pollution control program;
To conduct air pollution studies and investigations;
To issue regulations pursuant to the act;
To require registration of air pollution sources;
To approve any new air pollution sources;
To establish air emission standards;
To declare air emergencies;
To enforce the act.

PROHIBITED ACTS:

To fail to obtain a construction permit;
To violate emission standards;
To fail to comply with emergency orders;
To cause or allow the emission of obnoxious odors;
To violate other act provisions.

EXEMPTIONS:

May be granted by the department.

PENALTIES:

Fines of up to $1,000 or one year imprisonment.

VIRGIN ISLANDS PESTICIDES

TITLE:

Pesticide Control Act
Virgin Islands Code 12-801

PURPOSE:

To regulate, in the public interest, the use and application of pesticides to control pests.

DEFINITIONS:

1. Accident
2. Agricultural commodity
3. Applicator certificate
4. Certified applicator
5. Commercial applicator
6. Commissioner
7. Environment
8. Equipment
9. Land
10. Person
11. Pest
12. Pesticide
13. Private applicator
14. Restricted use pesticide
15. State
16. Unreasonable adverse effect on environment
17. Weed

ADMINISTERING AUTHORITY:

Department of Conservation and Cultural Affairs

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To classify pesticides and restrict their usage;
To conduct applicator training;
To regulate the storage, transportation and disposal of pesticides;
To establish certification standards;
To certify commercial and private applicators;
To enter and inspect property in enforcement of the act;
To develop a pesticide plan.

CERTIFICATION OR LICENSING:

Certification required for use of restricted use pesticides;
Categories and qualifications to be established by commissioner.

PROHIBITED ACTS:

To purchase, possess or use restricted pesticides without certificate;
To violate other regulations or act provisions.

PENALTIES:

Fines of from $50 to $200 or up to one year imprisonment.

VIRGIN ISLANDS WASTE WATER

TITLE:

Oil Spill Prevention and Pollution Control Act
Virgin Islands Code 12-701

PURPOSE:

To preserve the highest use of the waters and shorelines of the territory, and to deal with the hazards presented by oil transfers and related activities.

DEFINITIONS:

1. Department
2. Commissioner
3. Barrel
4. Other measurements
5. Discharge
6. Fund
7. Pollutants
8. Pollution
9. Terminal facility
10. Owner
11. Transferred
12. Vessel
13. Harbor master
14. Person in charge
15. Discharge cleanup organization
16. Person

ADMINISTERING AUTHORITY:

Department of Conservation and Cultural Affairs

AUTHORIZATIONS:

To issue regulations pursuant to the purposes of the act;
To develop contingency spill cleanup plans;
To supervise cleanup operations;
To license terminal facilities;
To deal with spill and discharge emergencies;
To enforce the act.

PROHIBITED ACTS:

To discharge oil, petroleum or their byproducts into coastal or other state waters;
To operate a terminal facility without a license;
To fail to report any oil spills or discharges;
To allow derelict vessels on public waters;
To violate other act provisions.

PENALTIES:

Fines of up to $50,000; liability also imposed for the cost of all cleanup operations.

VIRGIN ISLANDS WASTE WATER

TITLE:

Water Pollution Control Law
Virgin Islands Code 12-181

PURPOSE:

To establish a program of water pollution prevention, abatement and control, and to conserve the water resources of the territory.

DEFINITIONS:

1. Pollution
2. Pollutant
3. Sewerage system
4. Treatment works
5. Disposal system
6. Waters of the Virgin Islands
7. Person
8. Commissioner
9. Discharge
10. Point source
11. Effluent limitations
12. Water quality standards
13. Water quality criteria
14. Schedule of compliance
15. Municipality
16. Permit
17. Industrial user
18. Publicly owned treatment works

ADMINISTERING AUTHORITY:

Department of Conservation and Cultural Affairs

AUTHORIZATIONS:

To act as the territorial lead agency in water pollution matters;
To generally supervise water pollution control programs;
To issue regulations pursuant to the act;
To conduct studies and investigations relating to water pollution;

AUTHORIZATIONS (Cont'd):

To adopt water quality standards;
To issue pollution abatement orders;
To approve disposal system construction;
To administer a pollutant discharge permit program;
To monitor water quality;
To enforce the act.

PROHIBITED ACTS:

To construct or alter disposal system without permit;
To discharge into waters without permit;
To discharge any radiological, chemical or biological warfare agent;
To violate the terms of any permit;
To violate other act provisions.

PENALTIES:

Civil - fines of up to $10,000 per day;
Criminal initial violation - fines of from $2,500 to $25,000 per day;
Criminal subsequent violation - fines of up to $50,000 per day.